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Measures to Restore and Protect the Baltic Sea Environment

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With 1 Figure

Characteristics of the Baltic Sea

The Baltic Sea is one of the greatest semi-closed sea areas in the world. The entrances are both shallow and narrow. Inside them the Baltic Sea contains several deep basins divided by thresholds. The depth of the main basins is about 100–200 meters and the maximum depth is slightly more than 450 meters. The mean depth, however, is only 55 meters.

The drainage area (Fig. 1) has varying geographical conditions. In the north-western part you find mountainous areas, in the north and eastern part mainly forests, wetlands and lakes, in the south and west agricultural areas. Within the drainage area, there is a population of about 80 million people. These people are very unevenly distributed, with more than 50 million living on the southern side of the Baltic Sea. There are, however, even local areas in other regions with a great population, e.g. St. Petersburg and the Leningrad region, with more than 8 million.

The Baltic Sea, the largest water body with brackish water in the world, is a very sensitive sea area. It depends on short and long term variations in weather and climate and has several times during its history transformed from lake to sea, from fresh water to saline water. The ecosystems are continuously under stress. The marine species are suffering from the decreasing salinity from the entrances to the Bothnian Bay and the limnic organisms from the increasing salinity in the other direction. All kinds of other disturbances, such as pollution increase stress and threaten the ecosystems.

A strong salinity stratification between the brackish surface water and the saline deep water originating from the North Sea reduces the vertical mixing of the water and the downward transport of oxygen from the surface. The deep saline water is exchanged with many years interval through rare pulses of oxygen rich water from the North Sea. The result is that the oxygen content in the deep water is reduced to zero for long periods and hydrogen sulphide is formed. Dead bottoms are caused over vast areas of the Baltic Sea.

The mean residence time for the whole water mass is of the order of 25–30 years. This means that it will take a long time before any results of reducing the discharges of, e.g. persistent toxic pollutants are to be observed in the open sea.

The human influence

The vulnerable marine environment is strongly threatened by human activities in the Baltic Sea and its drainage area. The threats are coming from all the countries but the most acute are the ones from the former communist states on eastern, south-eastern and southern side of the sea. Of the 80 million people living in the drainage area 30 million are lacking proper waste water treatment. We find municipalities and industries discharging their untreated waste waters directly to watercourses and coastal waters. The inadequate or total lack of municipal treatment is compounded by lacking pre-treatment of industrial waste waters, which are discharged to the municipal sewage systems. Agricultural practices, including intensive livestock husbandry, are a major contributor to the high nutrient load. That stands also what regards nitrogen for traffic within as well as outside the drainage area. According to the second pollution load compilation by HELCOM, based on data from 1990, the approximate annual load into the Baltic Sea was in the beginning of the present decade 962.000 tons of nitrogen (both waterborne and airborne) and 45.800 tons of phosphorus (waterborne). There is a risk that the mentioned values, however, are to low due to uncertainties in the reported values. More than 30 percent of the total load of nitrogen emanates from atmospheric deposition and about 35 percent of that amount are estimated to emanate from sources outside the Baltic Sea Drainage Area. The mentioned load levels are estimated to represent three times those of the 1950s.

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The inputs of large amounts of phosphorous and nitrogen compounds result in an excessive growth of biomass. The resulting eutrophication is especially seen in the Gulf of Finland, the Gulf of Riga and in the coastal areas of the eastern, southern and southwestern Baltic Sea area. Intense algal blooms appear not only in local or regional coastal areas but also in the open sea. In some areas even toxic algae appear, causing additional problems. The decay of this vast biomass depletes oxygen and thus threatens marine life.

Although concentrations of heavy metals in fish and shellfish have not increased significantly since the early 1980s, the concentrations are still higher than the background values. Enrichment of the most toxic metals, cadmium, mercury and lead, is about the same both in the Baltic and the North Sea fish, and well below hazardous levels for human consumption, according to WHO standards. In the southern Baltic, a downward trend in lead concentrations, probably due to the elimination of lead in car petrol, has been observed. The ban of the use of certain persistent toxic organic compounds, such as DDT and PCBs, has led to their significant decrease in the biota since 1974. Due to remedial action by the Finnish and the Swedish industry, the concentrations of toxic substances in biota have decreased distinctly in the northern part of the Baltic Sea.

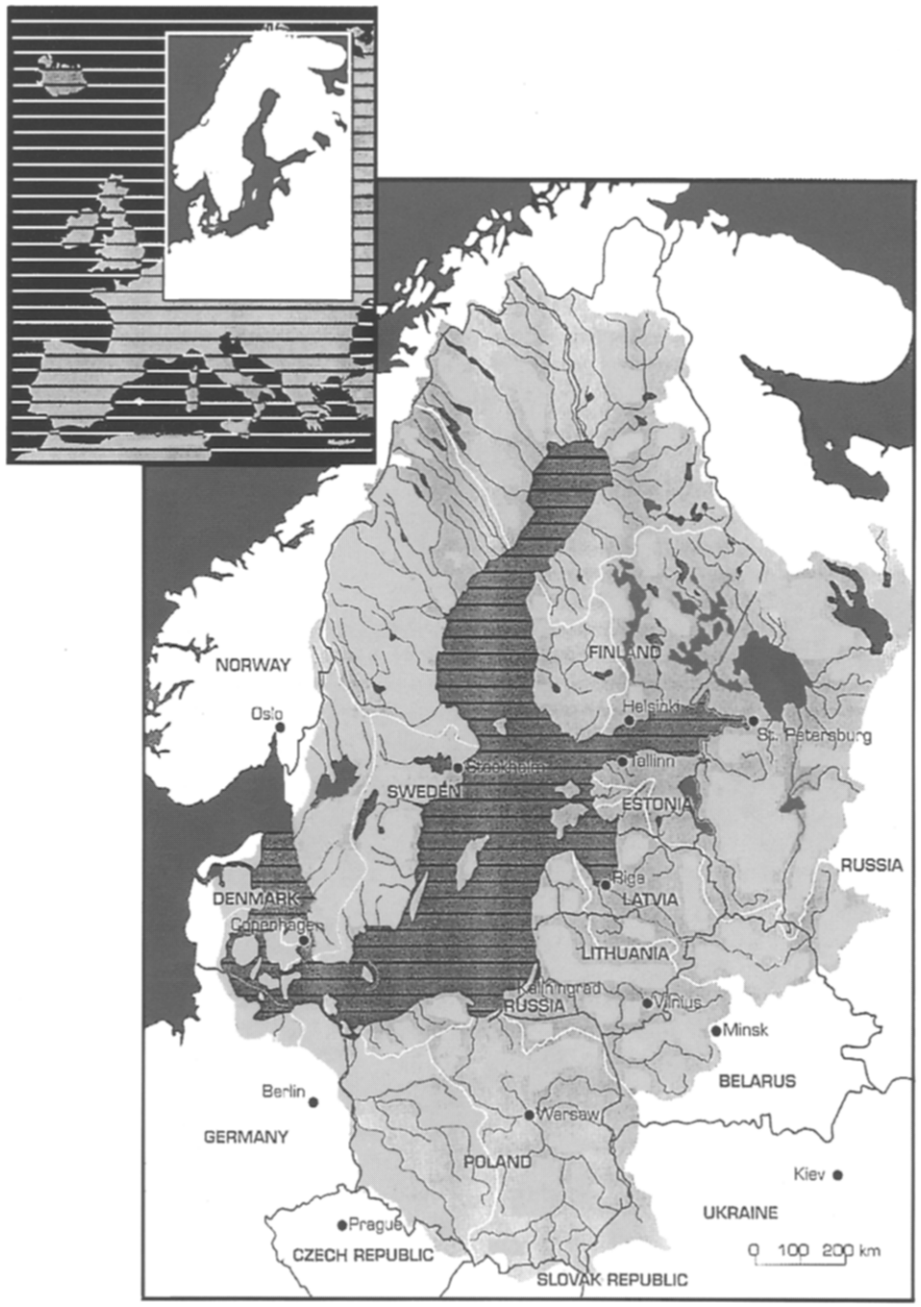

Fig. 1. The drainage area of the Baltic Sea.

The heavy pollution load from agriculture and industry in the countries being in economic transition has decreased considerably during the last years. One reason for this is reform of ownership within agriculture as well as disappearance of former markets resulting in disintegration of former collective and state farms into cooperatives and private farms. This has led to a reduction in the consumption of fertilizers and pesticides and a reduction in the number of cattle and pigs on the farms. In Estonia e.g., the number of cattle is estimated to have been reduced to almost half between 1988 and 1994 from 820.000 to 460.000 and the number of poultry to a fourth from 6.8 to 1.8 million. The use of nitrogen fertilizers has during the same time period gone down from 110.000 tons to 30.000 tons, phosphorous fertilizers from 60.000 tons to 10.000 tons and pesticides from 1.850 tons to 240 tons. The situation is similar in the other countries in transition. Concerning industry the production has also decreased considerably due to the transition into market economy. Many enterprises and plants have been closed and others have reduced their production because of losing the eastern

market for which the production was mainly oriented and also due to incapacity to compete on the western market so far. A new compilation of the pollution load on the Baltic Sea is now under preparation based on measurements and estimates during 1995. It is estimated to be published in 1997.

Environmental effects on living resources

The effects of toxic substances on the biological system of the Baltic Sea are very serious. Since long, populations of birds and seals in the Baltic Sea, e.g., have been threatened by pollutants, such as heavy metals and organochlorines. The white-tailed eagle was e.g. close to extinction. Due to decrease in discharges and other action, these populations are now recovering. Concerning seals can be mentioned that in some areas rapidly growing seal populations now cause strong conflicts with fishermen and their organizations.

The general decrease of oxygen in the deeper water of the Baltic Sea has severely weakened the cod catch. Significant increases in the prevalence of several fish diseases in the entrance areas are related to decreasing oxygen conditions.

Fish with severe injuries were earlier found locally outside pulp and paper industries but have disappeared in pace with remedial action at the plants. For the moment the stocks of wild salmon are close to extinction, not only due to overfishing, but also due to a disease known as M-74 phenomenon, suggested to be related to the combined effects of pollutants.

The Helsinki Conventions

The Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1974, in short the Helsinki Convention, was signed more than 20 years ago by the then seven Baltic Sea States (Denmark, Finland, German Democratic Republic, Federal Republic of Germany, Poland, Sweden and the USSR). The Convention entered into force in 1980, when it was ratified by all the mentioned states. It covers the whole sea area out to the border between Kattegatt and Skagerrak but excludes the internal waters.

The objective of the Helsinki Convention is to protect the Baltic marine environment against all forms of pollution. In 1992, a revised Convention based on the many years of experience with the 1974 Convention was signed. The new Convention also covers the internal waters of the Contracting Parties and takes into account nature conservation. It also reflects developments in the international environmental policy and the environmental law.

The 1992 Convention tightens and specifies measures to combat pollution from land-based sources. A precise objective is to prevent and eliminate pollution in order to ensure the ecological restoration of the Baltic Sea, self-regeneration of its environment and preservation of its ecological balance. Best Environmental Practice and Best Available Technology are to be used for this purpose and the Polluter Pays Principle is to be applied.

The new Convention presupposes that preventive measures must be taken in the whole drainage area of the Baltic Sea. Furthermore, the Signatories shall individually and jointly take all appropriate measures to conserve natural habitats and biological diversity.

So far, the 1992 Helsinki Convention has been ratified by Denmark, Estonia, the European Community, Finland, Latvia, Germany and Sweden.

The decision-making body of the Helsinki Convention is the Baltic Marine Environment Protection Commission, or the Helsinki Commission (HELCOM), an intergovernmental organization with a permanent international secretariat in Helsinki. At present, the members of HELCOM are all the Baltic Sea States, viz. Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden, as well as the European Community. The Recommendations by the Commission have to be implemented through national laws, policies, standards, etc. They are not legally binding but have quite a binding force since they are taken unanimously.

The organization of the Helsinki Commission comprises at present the Commission, four permanent Committees and the HELCOM Programme Implementation Task Force (working at committee level with expanded participation). They have several working and expert groups, and the work is further supported by informal meetings, workshops, seminars and symposia for specific topics.

The Environment Committee works on joint monitoring programmes covering different sectors of the marine environment, the open sea, coastal waters, and airborne pollution. The data are compiled into joint databases and evaluated at regular intervals by experts from the Baltic Sea States in order to assess the environmental conditions. The third assessment of the status of the marine environment is under elaboration and will be published in 1997.

The Technological Committee works on restriction of discharges into waters and emissions to the atmosphere from urban areas, industry and diffuse sources, including agriculture. Recommendations are prepared on banning or decreasing the use of certain substances or on reducing discharges and emissions. It also makes at regular intervals compilations on the pollution load to the Baltic Sea.

The Maritime Committee takes measures against all kinds of operational pollution from ships and offshore platforms and deals with facilities in ports to dispose of ships' wastes. It also coordinates the activities of the Baltic Sea States in matters concerning the protection of the Baltic Sea from pollution by ships. At present, one of the main concerns is how to reduce the illegal discharges of oil in the Baltic Sea and how to develop a harmonized procedure of bringing the offenders of discharge regulations into court.

The Combatting Committee elaborates the rules and guidelines for cooperation in combatting spillages of oil and

other harmful substances. It also coordinates airborne surveillance with remote sensing techniques to find and record oil discharges.

The HELCOM Programme Implementation Task Force plans and coordinates the implementation of the Baltic Sea Joint Comprehensive Environmental Action Programme.

The Baltic Sea Joint Comprehensive Environmental Action Programme

During the late 1980s – and even more clearly after the collapse of the socialist regimes in Eastern Europe in the early 1990s – it was evident that the Helsinki Convention had not been the leading star for all the governments around the Baltic Sea with respect to action taken to protect the environment. Many of the decisions/recommendations by the Helsinki Commission had, unfortunately, not been implemented in practice. This was especially true in the present countries in transition, where there are regions with partly destroyed environment. Industry operates with outdated technology and emits harmful substances, with great amounts of harmful and toxic wastes stored in landfills without control or protection against leakage. Municipalities discharge their waste waters without any treatment. Agriculture does not take environmental conditions into account.

For taking action against this very serious situation, the environmental ministers from the Baltic Sea States committed themselves at a meeting in 1988 to cut down the discharges entering the Baltic Sea of some harmful substances and nutrients by 50% by 1995. As the next and more powerful step, a conference at prime ministerial level was held in Ronneby, Sweden in 1990. The prime ministers decided to set up an *ad hoc* High Level Task Force to elaborate a programme to restore the Baltic Sea to a sound ecological balance.

Within the Task Force four international financial institutions, viz. the European Investment Bank, the European Bank for Reconstruction and Development, the Nordic Investment Bank and the World Bank, acted as Executing Agencies for prefeasibility studies in eight areas in Russia, Estonia, Latvia, Lithuania, Poland, Germany and the former Czech and Slovak Federal Republic.

In addition, topical studies were carried out within the Task Force dealing with airborne pollution, agriculture and wetland areas. The national plans submitted to the HELCOM *ad hoc* High Level Task Force as background material were used in the preparation of the Action Programme, as well.

The resulting Baltic Sea Joint Comprehensive Environmental Action Programme (JCP) was also approved as regards principles and strategies at a Diplomatic Conference in Helsinki in 1992 and a Programme Implementation Task Force, HELCOM PITF, was established within the framework of the Helsinki Commission.

The Programme consists of six major components:

1. Policies, Laws and Regulations
2. Institutional Strengthening and Human Resource Development
3. Investment Activities
4. Management Programmes for Coastal Lagoons and Wetlands
5. Applied Research
6. Public Awareness and Environmental Education.

As to the investments in point and non-point source control, the Programme focuses on 132 "hot spots", all land-based pollution sources. The Programme shall be implemented within a twenty-year period, 1993–2012; the financial resources needed have been estimated to be 18 billion ECU.

All the countries within the Baltic Sea drainage area (the Contracting Parties to the Helsinki Convention, Belarus, Czech Republic, Norway, Slovak Republic and the Ukraine), the European Community and five international financial institutions (the four earlier mentioned and the Nordic Environment Finance Corporation), participate in the HELCOM PITF. Also the Baltic Sea Fishery Commission (IBSFC), as well as some non-governmental international environmental organizations take actively part in the work.

A High Level Conference on Resource Mobilization was held in March 1993 in Gdansk, Poland. This conference was attended by the Ministers of the Environment or their deputies from the countries concerned, as well as by representatives from international financial institutions, international intergovernmental and non-governmental organizations.

Implementing the various components of the Programme started in 1993. Some of the countries involved have taken the responsibility as lead party for a whole element or a substantial part of an element. Furthermore, the non-governmental organization World Wide Fund for Nature (WWF) has taken the lead for programme element number 4 "Management Programmes for Coastal Lagoons and Wetlands". Other NGOs, such as Coalition Clean Baltic (CCB), the International Council for Local Environmental Initiatives (ICLEI) and the Union of the Baltic Cities (UBC) also contribute quite actively to the implementation work supporting the elements "Public Awareness and Environmental Education", "Policies, Laws and Regulations", and "Institutional Strengthening and Human Resource Development".

As to "Investment Activities for Point Source Pollution", the international financial institutions involved are active here as well as a number of donor countries acting bi- and multilaterally. Finland and Sweden have taken a lead party for this element.

For "Non-Point Source Pollution" Poland and Germany share the responsibility, acting within the sectors of agriculture and traffic, respectively.

Results achieved within the Action Programme

For programme elements 1 and 2, "Policies, Laws and Regulations" and "Institutional Strengthening and Human Resources Development", the lead party Germany has arranged a variety of seminars and training for the countries in transition. The co-lead parties ICLEI and UBC provide various comprehensive support on the local level. The Nordic Countries are also equally active in providing training for experts, rendering advice and arranging seminars.

The implementation of requisite laws, policies and regulations is progressing. Estonia, Latvia, Lithuania and Poland stress their wish to bring their legislation towards conformity with EU legislation and international norms. Most of the countries in transition have also improved their use of economic instruments to gather resources for waste water treatment, in particular, and protective measures for the environment, in general.

In spite of many seminars and training courses, available national experts are still very scarce in relation to the actual need. This holds true for both the central and regional and local levels. The countries in transition need multiple assistance in terms of financing and transfer of know-how for the establishment of public infrastructures as well as for training of experts.

A working group under the lead of WWF for "Management Programmes for Coastal Lagoons and Wetlands" has specified key target areas and so-called Area Task Teams have been set up to develop management plans in a decentralized manner.

"Public Awareness and Environmental Education" is also dealt with by a working group with Finland as lead party, supported by the Coalition Clean Baltic (CCB). A number of joint projects have been identified which will call for financial support during the nearest future.

As to "Investment Activities for Point Source Pollution", of the 132 hot spots identified eight have been removed from the list, so far. They are four pulp and paper industry plants in Finland and four in Sweden and two municipal waste water treatment plants in Germany. In a number of other hot spots, the pollution load reduction has started and is proceeding step-wise. A few projects are almost finalized, many are under construction or advanced planning, but a great number still remain to be taken care of.

It can be noted that the countries in transition themselves are firmly committed to tackle their hot spots to the extent possible with own resources. Poland has currently more than 1000 waste water treatment plants under construction, and about 300 are completed annually. More than 95% of the costs for environmental actions are covered nationally. Lithuania has allocated 2.7% of its national budget for waste water treatment. Similar commitments can bee found in the other Baltic republics as well. Regarding major hot spots, co-financing has become instrumental to get major projects under way. Best examples are the projects in Vilnius, Klaipeda, Kaunas, Liepaja, Tallinn and Haapsalu/Matsalu – all in the Baltic States. Here we see besides requisite national resources, the World Bank, NEFCO, EBRD, Denmark, Finland, Sweden, the EU-LIFE and PHARE Programmes, EUCC and WWF as co-financiers.

As to non-point sources of pollution, e.g. agriculture and traffic, a plan for balanced fertilization is under development as well as a strategy for the reduction of emissions from traffic. For tackling the latter HELCOM has now adopted a Recommendation paving the way for future strategy and pollution abatement.

As there is the 20 years' time span for implementing the JCP, the total sum of allocated or reserved resources looks promising for the first three years. More than 2 billion ECU have been allocated or reserved of the estimated total costs for investments of 10 billion ECU for the point source hot spots. When examining the distribution of investments between municipal and industrial projects we are forced to conclude that the industrial sector is progressing very slowly. The main part of the allocated or reserved funds is related to municipal waste water treatment and only 25% to industry.

Experiences

Of great importance for the development of the cooperation on the protection of the marine environment of the Baltic Sea and elaboration of the Helsinki Convention was the understanding by all the governments of the Baltic Sea States that it is a joint interest to have a living Baltic Sea. The not legally binding HELCOM recommendations have therefore also been implemented in national legislation and policy in all contracting parties. However, the recommendations have not been implemented in practice and controlled by responsible authorities especially in the former communist countries. The follow-up by Helsinki Commission has not during the past years had such a form that this clearly was demonstrated. For the future a well developed and harmonized follow-up system must be agreed upon and introduced. It is for the moment under elaboration in conjunction with preparing the reporting of the implementation of ministerial decisions taken in 1988. It contains detailed reporting procedures substance by substance or groups of substances, methods for laboratory analysis and intercalibration.

The positive results achieved during the first years of implementing the JCP has several reasons. First of all, the initiative to the action programme was taken at the highest possible level, by the Prime Ministers. That guaranteed necessary resources and political pressure while elaborating the programme as well as the commitments later on by the countries involved to implement the adopted programme.

Of primary importance was also the involvement of the International Financial Institutions, IFIs, from the very beginning in the elaboration of the programme. They conduct-

ed pre-feasibility studies in eight regions in the former communist states and have developed a thorough knowledge of needs and conditions in the areas concerned. While elaborating the programme the different conditions in different regions of the drainage area have been taken into account and in that way has the regional interest been kept high.

The continued participation of the IFIs in the implementation of the programme, the continuously intensive bilateral assistance rendered particularly from HELCOM-PITF countries as well as of HELCOM observer organizations have facilitated mobilization of financial resources. The IFIs are the mainly managers regarding project preparation, wrapping up of financing from various sources and control its implementation. Assistance for implementing the JCP has been rendered also by a variety of other countries and organizations. Especially should be mentioned the support by twin cities and organizations of cities like Union of the Baltic Cities, the Nordic Capitals and the Hanseatic cities. Concerning major investment projects co-financing has become instrumental with contributions from IFIs, donor countries, the EU-funds and different organizations besides the national contribution.

The philosophy to use step-wise approaches – it must not necessarily be Best Available Technology at once – and cost effective methods increase the efficiency of pollution load reductions substantially. In order to make it financially possible to work not only with major waste water treatment plants a number of small and medium size municipalities have been gathered to joint projects to create a big enough financial package to be of interest for the financial institutions.

Further has the involvement of the nongovernmental organizations been of great importance for increasing public awareness and a public support for the efforts to restore the environment.

In some regions the progress is however rather slow. This is not due to lacking financial resources which the IFIs claim exist. The reason is instead that the mostly still very unstable legal and institutional framework creates a reluctance to invest. This causes particularly major problems of implementation regarding polluting industries whose legal status is mostly unclear, as their environmental liabilities for damages caused during earlier time periods. That is why the important contribution of private investments is missing almost entirely. In the municipal waste water treatment and clean water supply area, tariffs may be set, but remain often largely unpaid. The security of refinancing investments is, therefore, undercut.

Some donors restrict the use of the grants made available to equipment and enterprises from their own country. In that way often the amount of work carried out and the transfer of knowledge and experience will be less than with the use of staff and companies from the recipient country.

The flow of information on planned and ongoing activities from all parties involved is still rather poor. There is a risk that this causes duplication and hinders optimal use of existing resources. Sensible coordination of information at all levels could promote the process of implementation.

One of the most important matter for the implementation process is to keep the political interest and pressure high through many years even if other acute political questions are coming up. The present bad financial situation in many donor countries makes this of course difficult for HELCOM. However, the Swedish Prime Minister has called for a new conference on prime ministerial level in May 1996, with environmental cooperation as one of the main items to be discussed. Hopefully this prime ministerial conference will give some extra impetus to the ongoing HELCOM activities to restore the Baltic Sea to a sound ecological balance, as set as a goal for the JCP.

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